

Creating a New Bioscience Research Infrastructure for Cost-Competitive, Carbon-Neutral Biofuels

High-Throughput User Facilities

Enabling understanding of biological capabilities at all scales, from genes to ecosystems

Cellular Systems Facility Develops predictive understanding of cell and community

Ecosystem

Proteomics Facility Explores how living cells

respond to environmental

cues

Community

Cell

Molecular Machines Facility Determines how molecular machines are formed and how they function

Genes

Machine

Protein Production Facility Produces and characterizes cellular components encoded in genomes

Microbial

Genomes

DOE Joint Genome Institute Sequences the genomes of microbes with capabilities important to DOE missions.

The genome determines dynamic biological structure and function at all scales, from genes to ecosystems.

Proteins

The Basics: From DNA to **Living Cells to Communities**

- The genome is an organism's complete set of DNA.
- DNA contains genes whose sequences specify how and when to build proteins.
- Proteins perform most essential life functions, often working together as molecular machines.
- Molecular machines interact through complex, interconnected pathways and networks to make the working cell come alive.
- Communities of cells are associations of microbes (each a single cell) working together in a particular environmental niche.